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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,176	01/14/2005	Hiroshi Okamura	OKAMURA6	2935
1444 7590 05/11/2007 BROWDY AND NEIMARK, P.L.L.C. 624 NINTH STREET, NW SUITE 300 WASHINGTON, DC 20001-5303			EXAMINER BHAT, NARAYAN KAMESHWAR	
			ART UNIT 1634	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/521,176	Applicant(s) OKAMURA ET AL.	
	Examiner Narayan K. Bhat	Art Unit 1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 March 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 10-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☒ Claim(s) 6 and 7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/14/2005 &amp; 9/26/2005</u>                                 | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed on January 14, 2005. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.
2. Claims 1-16 are pending in the application.
3. Claims 10-16 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on March 15, 2007.
4. Claims 1-9 are under prosecution.

### **Election/Restrictions**

5. Applicant's election with traverse of Group I, claims 1-9, in the reply filed on March 15, 2007 is acknowledged. The traversal is on the grounds that there are common technical features that are dependent on dependent claims of elected group I which can be incorporated into inventions of group II and III. This is not found persuasive because as described in this office action in the previous office action, the invention has been taught by prior art and therefore is not a contribution over the prior art. Therefore restriction for examination purposes as indicated is proper.

### **Claim Objections**

6. Claim 6 and dependent claim 7 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. See MPEP § 608.01(n). Claim 6, is dependent upon claims 3 and 4, which are also multiple dependent claims. Since claim 7 is dependent on claim 6, it is also objected. Accordingly, the claims 6 and 7 have not been further treated on the merits.

### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-2, 4-5 and 8-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Chrisey et al (USPN 5,688,642 issued November 18, 1997).

Regarding claim 1, Chrisey et al teaches a solid support (Fig. 4, element # 10), having an electrostatic layer (Fig. 4, element # 42) for electrostatically attracting nucleic

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acid molecule (Fig. 4, element # 48, Column 6, lines 45-63). Chrisey et al teaches that the negatively charged DNA oligomer electrostatically binds to the solid support containing aminosilane coating (Column 6, lines 50-54) thus teaching, the aminosilane coating layer on the solid support is the electrostatic layer. Chrisey et al also teaches solid surface (Fig. 5, element # 100) contains a functional amine group for covalent binding of nucleic acid molecule (Fig. 5, element # 110, Column 7, lines 10-14), thus encompassing a solid support having an electrostatic layer for electrostatically attracting a nucleic acid molecule and a functional group capable of covalently binding to a nucleic acid molecule on a substrate.

Regarding claim 2, Chrisey et al teaches wherein the substrate is diamond (Column 7, lines 24-28).

Regarding claim 4, Chrisey et al teaches that negatively charged DNA oligomer electrostatically binds to the solid support containing aminosilane coating (Column 6, lines 50-54) thus teaching, the aminosilane coating layer on the solid support is the electrostatic layer. Chrisey et al further teaches that organosilane covalently binds to the substrate (Column 4, lines 19-28) and the organosilane compound has an amino group at the terminus to which substrate does not bind (Fig. 5, element # 108, see the terminal amino group).

Regarding claim 5, 8 and 9, Chrisey et al teaches solid support (Fig. 5, element # 100) coated with silane that is resistant to the binding of nucleic acid (Fig. 5, element # 102, Column 6, lines 64-67), that is carbon compound on the substrate, and then introducing amino terminated silane having an un-substituted amino group (7, lines 5-12) to introduce functional group capable of covalent binding to a nucleic acid molecule (Fig. 5, See element # 108 for the free amino group and element # 110 for DNA; Column 7, lines 10-14) thus immobilizing the nucleic acid molecule on the solid support. Thus teachings of Chrisey et al encompass the embodiments of the said claims.

9. Claims 1, 3-5 and 8-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Schwartz (USPN 6,911,535 filed January 15, 2002).

Regarding claim 1, Schwartz teaches a solid surface (Fig. 1, Panel 4, element # S; Column 3, lines 28-32) having an electrostatic layer made up of functionalized cationic polymer (Fig. 1, Panel 1, element # P) conjugated with biomolecule (Fig. 1, Panel 3, element # BP) and electrostatically attracting said conjugate to the solid surface (Fig. 1, Panel 5, element # BPS). Schwartz further teaches that biomolecule is nucleic acid (Column 5, line 57). The functionalized cationic polymer-biomolecule conjugate (herein after referred as BP) of Schwartz is the electrostatic layer of the instant claim. Schwartz also teaches that the BP is immobilized on the solid support via electrostatic interaction between the cationic polymer and the solid support (Column 15, lines 38-42) thus teaching a solid support having an electrostatic layer for electrostatically attracting a nucleic acid molecule.

Schwartz teaches a functional group (Fig. 4, amino group of Hydrazine derivative) capable of covalently attaching a biomolecule to the cationic polymer and then attaching BP to the solid support (Fig. 1, Panel 5, element # BPS, See the covalent binding of BP functional group A to functional group B on the substrate). Schwartz also teaches the covalent binding of BP to the solid support is through 5' hydrazine oligo/ surface CHO/poly-l-lysine (Fig. 5, see the legend also see row C and lanes 2 & 3; Column 22 & 23, lines 42-67 & 1-14), thus teaching a functional group capable of covalently binding to a nucleic acid molecule on a substrate. The teachings of Schwartz thus encompass the embodiments of the said claims.

Regarding claim 3, Schwartz teaches BP, i.e., electrostatic layer, include cationic polymer that is poly-l-lysine containing side chain amino group immobilized on the solid support via electrostatic interaction between the cationic polymer and the solid support (Column 15, lines 38-42) thus teaching amino group containing compound, which does not covalently bind to the substrate.

Regarding claim 4, Schwartz teaches BP, i.e., electrostatic layer, include cationic polymer, that is poly-l-lysine, containing side chain amino group functionalized with hydrazine derivative containing amino group as well capable of conjugating a oligonucleotide, a biomolecule with the cationic polymer (Fig 4, see the last step).

Schwartz also teaches the covalent binding of BP to the solid support is through 5' hydrazine oligo/ surface CHO/poly-l-lysine (Fig. 5, see the legend and also see row C

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and lanes 2 & 3; Column 22 & 23, lines 42-67 & 1-14), thus teaching a amino functional group of hydrazine capable of covalently binding to the substrate. Schwartz further teaches that the BP containing cationic polymer with side chain amino group is also immobilized on the solid support via electrostatic interaction between the cationic polymer and the solid support (Column 15, lines 38-42) thus teaching amino group containing compound, in the electrostatic layer which does not covalently bind to the substrate. Thus the teachings of Schwartz encompass the embodiments of the said claim.

Regarding claim 5, Schwartz teaches hydrazine derivative compound having monosubstituted amino group (Fig. 4, Panel 2, see the hydrazine derivative compound in the middle) capable of attaching biomolecules to the cationic polymer, that is, BP (Fig. 4, last step, Column 14 & 15, lines 60-67 & 1-3). Schwartz also teaches aldehyde modified solid support (Column 21, lines 40-46), which is carbon compound on the substrate. Schwartz further teaches immobilization of BP to the aldehyde coated solid surface is via covalently immobilizing BP through 5' hydrazine oligo/ surface CHO/poly-l-lysine (Fig. 5, see the legend, also see row C and lanes 2 & 3; Column 22 & 23, lines 42-67 & 1-14) thus encompassing the embodiments of the said claim.

Regarding claims 8 and 9, Schwartz teaches the nucleic acid molecule is oligonucleotide, that is, DNA (Column 4, lines 9-13) immobilized on a solid support



(Column 4, lines 45-50).

### ***Double Patenting***

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1-5 and 8-9 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3 and 13-17 of copending Application No. 10/182434 in view of Schwartz (USPN 6,911,535 filed January 15, 2002). Although the conflicting claims are not identical, they are not patentably distinct from each other because scope of the invention between pending applications is similar.

Regarding claim 1, the '434 copending application teaches a carrier ('434, claim 1) carrier for fixation of a oligonucleotide wherein an oligonucleotide is fixed on a substrate selected from the group consisting of glass, diamond, metal and polymers, and layered products of ceramic with diamond, metal or glass, wherein the surface of the substrate is chemically modified with a hydrocarbon group having a polar group at the terminal, wherein oligonucleotide has a restriction enzyme cleavage site. The '434 copending claims do not teach electrostatic layer. Schwartz teaches linking a biomolecules electrostatically and /or covalently to a modified or unmodified surface (Column 3, lines 10-14) producing higher yielding more stable immobilization and better reproducibility for immobilization of biomolecules (Column 3, lines 48-50).

It would be obvious to one having the ordinary skill in the art at the time the invention was made to use the electrostatic layer of Schwartz to the carrier of '434 copending application to use both covalent and/or electrostatic layer interchangeably. One would be motivated to do so to produce higher yielding more stable immobilization and better reproducibility of immobilization of biomolecules as taught by Schwartz (Column 3, lines 48-50) thus improving the carrier property. Instant claim 1 is obvious in view of Schwartz. The dependent claims 2-5 and 8-9 with identical limitations are taught by claims 2-3 and 13-17 of the '434 application in view of Schwartz.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

**Conclusion**

12. No claim is allowed

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Narayan K. Bhat whose telephone number is (571)-272-5540. The examiner can normally be reached on 8.30 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram R. Shukla can be reached on (571)-272-0735. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Narayan K. Bhat Ph. D.

Examiner

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**JULIET C. SWITZER**  
**PRIMARY EXAMINER**